Amendment to the Claims

The current status of all the claims of the application follows:

1. (Currently amended) A process for the manufacture of a catalyst for selective hydrogenation of a feed stock comprising

preparing a catalyst support from a carrier material selected from the group consisting of alumina, zinc oxide, nickel spinel, titania, magnesium oxide and cerium oxide,

impregnating the catalyst support with a palladium metal source and an additive to form a catalyst material, wherein the catalyst material comprises from about 0.001 to about 0.028 weight percent palladium, from about 0.04 to about 0.15 weight percent of silver, wherein the ratio of the silver to the palladium is from about 1:1 to about 20:1, and wherein the weight percentages are based on the total weight of the prereduced catalyst,

reducing the ~~palladium-impregnated~~ catalyst with a reducing material,

without permitting the reduced catalyst to reoxidize, placing the reduced catalyst in a container under a non-oxidizing material, and

distributing the prereduced catalyst in the container to a customer while maintaining the reduced catalyst under the non-oxidizing material.

2. (Original) The process of Claim 1 wherein the temperature

of reduction of the catalyst is from about 50°F to about 1000°F (10°C to 538°C).

3. (Original) The process of Claim 1 wherein the non-oxidizing material is selected from the group consisting of carbon dioxide, nitrogen, helium, neon and argon.

4. (Original) The process of Claim 1 wherein the non-oxidizing material is nitrogen.

5. (Original) The process of Claim 1 wherein the non-oxidizing material is carbon dioxide.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Canceled)

11. (Original) The process of Claim 1 wherein the selective hydrogenation process comprises a front-end hydrogenation process.

12. (Original) The process of Claim 1 wherein the selective hydrogenation process comprises a tail-end ethylene purification process.

13. (Original) The process of Claim 1 wherein the feed stock comprises a C_2 and C_3 olefinic feed stock.

14. (Original) A catalyst prepared by the process of Claim 1.

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (New) The process of Claim 1 wherein the catalyst material comprises from about 0.01 to 0.02 weight percent palladium based on the total weight of the prereduced catalyst.

23. (New) The process of Claim 1 wherein the ratio of the silver to the palladium in the catalyst is from about 2:1 to about 20:1 based on the total weight of the prereduced catalyst.

24. (New) The process of Claim 1 wherein the ratio of the silver to the palladium in the catalyst is from about 2:1 to about 6:1 based on the total weight of the prereduced catalyst.

25. (New) The process of Claim 1 wherein the ratio of the silver to the palladium in the catalyst is from about 12:1 to about 20:1 based on the total weight of the prereduced catalyst.

Basis for Amendment to the Claims.

The applicants has amended Claim 1 to clarify that the composition of the catalysts of the invention prior to reduction includes a specific quantity of palladium, a specific quantity of silver and a specific ratio of the silver to the palladium. Basis for this Amendment is contained in prior Claim 6 and Claim 10 of the application.

New Claim 22 is based on claim language from Claim 10, which is being canceled. Claims 23, 24, and 25 are based on disclosures on page 15, line 23 through page 16, line 1 of the application. No new subject matter is introduced by any of these amendments.

Further, because the language of the amendments to Claim 1 and new Claim 22 was present in the Claims at the time of the prior Office Action, no additional search will be necessary by the USPTO and the claims are proper for review even after a final rejection. In addition, as Claims 23 - 25 are merely narrower ranges of the silver to palladium additive ratio, as claimed in Claim 10, no additional search is necessary for these claims and the claims are appropriate for review even after a final rejection.

Discussion

The United States Patent and Trademark Office rejected Claims 1 - 14 under 35 USC §103 as being unpatentable over Wood, et. al. U.S. Patent No. 4,748,145. The USPTO also rejected Claim 14 under 35 USC §102(b) as anticipated by, or in the alternative under USC §103(a) as being obvious over, Wood, et. al. The applicants respectfully traverse each of these rejections.

The applicants have discovered a unique process for preparation of a selective hydrogenation catalyst with a particular composition. The composition of the catalyst has been more narrowly defined by the amendments to Claim 1 to distinguish the composition of this catalyst and its process of manufacture from the catalysts and process of manufacture that are disclosed by Wood, et. al.

While the Woods, et. al. conventional procedure for production of a selective hydrogenation catalyst requires reduction of the catalyst *in situ*, the applicants have surprisingly discovered a catalyst of a unique composition, which was prereduced *ex situ*. As a result it exhibits surprisingly improved selectivity, resistance to run away, tolerance to CO concentration swings, and improved performance at higher gas hourly velocities. (See the results shown in Table I - IV.) These results were surprising because a person skilled in the art reviewing the composition of the catalyst and their process of manufacture would have assumed that a catalyst

with this composition would perform in the same manner and not exhibit any improved selectivity, resistance to run away, tolerance to CO concentration swings, and improved performance at higher gas hourly velocities regardless of whether it was reduced *in situ* or *ex situ*. In fact, the applicants have surprisingly discovered that by the use of their prereduced catalyst, apparently different catalyst compositions are produced which when placed in a selective hydrogenation feedstream, result in improved performance over the prior art. Thus, the applicants have surprisingly discovered that their process of prereduction of a catalyst *ex situ* is critical to the enhanced performance of the selective hydrogenation catalyst of the invention.

Wood, et. al.

The sole reference cited against all of the claims of the application is Wood, et. al. Wood, et. al. disclose a catalyst composition comprising a catalytic material placed on a support, wherein the support is prepared by depositing a metal alkoxide on a core material. The catalyst support can be used as a common carrier for various catalysts of different compositions for a number of different catalytic procedures, including methanation (col. 5, line 62), olefin metathesis (col. 6, line 37), carbonylation (col.8, line 27), and hydrogenation (col. 14, line 28 at sec.).

The primary focus of Wood, et. al. is directed to the

composition of the support for various catalysts. A person skilled in the art reviewing the disclosure of Wood, et. al. would have understood that their disclosure was a support material, which has been modified by the addition of an alkoxide (see Claim 1 - 16). In fact, the use of this alkoxide support material was critical in distinguishing Wood, et. al. from the prior art. The remaining disclosures of Wood, et. al. merely showed the utility of the Wood, et. al. support material for various types of catalysts.

The carrier that is disclosed in Wood, et. al. is entirely different from the catalyst carrier as claimed in the application. The USPTO asserted that the applicants' support, which are chemically different from those which are disclosed in Wood, et. al., are "old and known as catalyst supports." The applicants do not argue with this assertion. However, the point of the applicants' previous argument was that the novelty in Wood, et. al. was focused solely on the composition of their support. The particular catalyst material and additives which are disclosed by Wood, et. al. are not novel. In fact, the only Wood, et. al. claims to the composition of a catalytic material is in Claims 2 and 16, where the active catalysis material was a group VIII metal. Thus, a person skilled in the art reviewing the disclosure of Wood, et. al. would immediately recognize that its teaching was only of the composition of a new support material.

In contrast, the claims of the application, as currently

pending, are focused primarily on a process for the production of a specific type of catalyst, a unique selective hydrogenation catalyst. As currently amended, the claims are narrowly focused to a specific selective hydrogenation catalyst prepared by a particular process, wherein the catalyst has a particular composition comprising palladium and silver, wherein the ratio of the silver to the palladium is within a particular range.

The USPTO has inherently recognized that Wood, et. al. fail to teach this particular composition. The USPTO has also recognized that there is no teaching of any preference for the combination of palladium and silver within the claimed ranges. Certainly there is no teaching of the combination of the particular quantities of silver and palladium with the particular ratio of silver to palladium. Notwithstanding, the USPTO argues that "using promoters with it is an obvious expedient to make a more effective catalyst." The applicants respectfully assert that the USPTO has read too much into the disclosure of Wood, et. al. A person skilled in the art would not have been taught all of the components and process steps that are not disclosed by Wood, et. al. including the following:

1. The requirement that the preferred catalyst composition is prereduced and placed under an inert atmosphere prior to utilization by the consumer. In fact, in the numerous preparations disclosed in the examples of Wood, et. al. from col. 17 through 25, none teaches prereduction and placement of a catalyst under an

inert atmosphere. Note particularly that the Wood, et. al. examples, which disclose a process for the preparation of a selective hydrogenation catalyst, i.e. Examples 10 and 11. These examples specifically fail to disclosed prereduction and placement of a catalyst under an inert atmosphere. (See col. 23 - 24). Thus, Wood, et. al. failed to recognized the criticality of this process step to produce this specific type of catalyst. In fact, by failing to disclose the requirement of placing a prereduced catalyst under an inert atmosphere, Wood, et. al. specifically teach away from this critical process step. Thus, a person skilled in the art would not have been taught by Wood, et. al. to prereduce a selective hydrogenation catalyst and then store that prereduced catalyst under an inert environment prior to its use.

2. Wood, et. al. fails to teach the preference for silver as an additive in the selective hydrogenation catalyst. While, Wood, et. al. disclose the possibility that group IB metals may be used, none are used in any of the Examples. Further, silver specifically is not disclosed as an additive in any of the examples. Thus, there was no recognition by Wood, et. al. of the requirement of including silver as an additive for palladium on a selective hydrogenation catalyst which was prepared by prereduction *in situ*. In fact, by failing to include this additive, a person skilled in the art would be taught away from necessity of its presence in a selective hydrogenation catalyst.

3. In addition to failing to recognize the importance of the use of silver as an additive to palladium for a selective hydrogenation catalyst, Wood, et. al. obviously also fail to recognize the particular quantity of silver that should be used and the specific ratio between the silver and the palladium that must be present. See Claims 1, 23, 24 and 25. Accordingly, there is no motivation or suggestion in Wood, et. al. to combine these materials, nor any motivation or suggestion to combine them in the amounts, as claimed, and certainly no motivation or suggestion to combine them in the ratios that are claimed.

***Prima facie* Obviousness**

The USPTO has established a strict three step process for proving *prima facie* obviousness under 35 USC §103, as explained in MPEP 2142-213. Failure to satisfy these steps means that obviousness has not been shown. The first step requires the Examiner to set forth the differences in the claim over the applied reference or references and to explain the suggestion or motivation that is present in the reference which would encourage a person skilled in the art to modify the reference to disclose the subject matter of the claims. The Examiner in this Office Action has acknowledged that there is no teaching of preventing reoxidation. The Examiner has also acknowledged that the particular catalyst promoters are not taught with the particular quantities and ratios of the additives. The Examiner has also acknowledged that the

process of storing the material under a non-reducing gas is not taught. "Wood makes the same catalyst even though possibly stored differently." Page 3.

Recognizing these deficiencies in the cited reference, the second step in the proof of *prima facie* obviousness requires the Examiner to prove that the proposed modification of the reference would be likely to arrive at the claimed subject matter. In this specific situation a number of additional components and process steps, which are not specifically disclosed, would need to be added to the teaching of Wood, et. al. before the applicants' invention is taught. For example, there must be a teaching to prereduce the catalyst and store the reduced catalyst in a non-reducing environment. This is clearly not obvious as it would be more expensive and more difficult then not to prereduce and storing. Further, the Examiner has not shown how the differences in the compositions of the material, as claimed, from the material disclosed in Wood, et. al. would be obvious, including not only the precise composition, but the quantity and ratio of the individual components of the catalyst.

The third step of the *prima facie* test requires the Examiner to explain why the proposed modification would be obvious and how it teaches <u>each</u> claim limitation. To satisfy this requirement, when the deficiencies in the cited reference are so significant and so numerous, the Examiner has merely stated that <u>all</u> of these

nondisclosed elements of the invention would be "obvious expedients". In fact, the Examiner uses that argument to describe six particular missing claim elements which are not disclosed in Wood, et. al. The applicants respectfully assert that all of these differences could not be "obvious expedients." The applicants respectfully assert that the USPTO has failed to satisfy its burden to establish *prima facie* obviousness.

In addition to satisfying the above-described three-part test, the USPTO is required to identify where in Wood, et. al. there is a motivating suggestion to utilize each of these missing claims elements. As none of these claim elements are specifically disclosed or suggested in Wood, et. al. because the focus of Wood, et. al. was not on the process of production of the catalyst or its composition but on the preparation of the catalyst support, the USPTO has failed in its proof. Specifically, there is no statement in Wood, et. al. of a preference for the storage of a prereduced catalyst under a non-reducing material, especially as that would be a more expensive process. There is no statement that the addition of silver to palladium would produce a better and higher preforming selective hydrogenation catalyst, especially as this addition would be more costly. There is no statement or suggestion in Wood, et. al. of any motivation which would teach a person skilled in the art to choose the particular quantities or the particular ratios of silver to palladium, which are claimed in the claims of the

application.

In In re Jones, 958 Fed. 2d 347, 21 USPQ2d 1941, 1944 (Fed. Cir. 1992, citing In re Lalu, 747 Fed.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984), the Court stated that "[t]he prior art must provide one of ordinary skill in the art the motivation to make the proposed... modification needed to arrive at the claim compound." The USPTO has failed to disclose any suggestion or motivation in Wood, et. al. to teach any, and certainly not all, of the above-referenced modifications to what is disclosed in Wood, et. al.

Moreover, the USPTO has failed to prove that the modifications that are necessary to be made to the catalyst of Wood, et. al. to arrive at the catalyst, as claimed, using the process as claimed, is a "desirable" modification. The "desirability" of the motivation must also be proved to establish *prima facie* obviousness

> The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 922 Fed.2d 1260, 23 USPQ2d 1780, 1783 -1784 (Fed. Cir. 1992).

Once again it is absolutely clear that none of the modifications that are necessary to the catalyst of Wood, et. al. or the process of manufacture of the catalyst of Wood, et. al. to result in the catalyst as claimed by the process, as claimed, could be termed by a person skilled in the art to be "desirable." Only the applicants' surprising discovery of the desirability of these modification resulted in the improvements in the catalyst and in

the process of its manufacture. The USPTO has not proved that there was any "desirability" in making those modifications.

In addition, the USPTO has failed to show that the motivating suggestion to make the various changes either to the process or the composition of the catalyst, as claimed, are "explicit" and not merely what are referred to as "obvious expedients."

> ... Invention can not be found obvious unless there was some explicit teaching or suggestion in art to motivate one of ordinary skill to combine elements so as to create same invention. Winner International Royalty Corp. v. Wang, 48 USPQ2d 1139, 1140 (D.C.D.C. 1998) (Emphasis supplied).

The USPTO has acknowledged that all of these differences between the invention and Wood, et. al. are not specifically disclosed by Wood, et. al. Thus, it is clear that they can not be "explicitly" disclosed. Thus, the USPTO has failed to satisfy the requirement for proof of obviousness, even under the guidelines set in its own MPEP.

CONCLUSION

Based on the failure to prove "*prima facie*" obviousness, the applicants respectfully request that the rejection of the claims, as amended, be withdrawn and that a Notice of Allowability be issued. If there are any questions concerning this Response to the Office Action, please contact applicants' counsel.

Respectfully submitted,

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